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Biophysical properties of protein-free, totally synthetic pulmonary surfactants, ALEC and Exosurf, in comparison with surfactant TA.

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An artificial pulmonary surfactant prepared from chloroform-methanol extract of bovine pulmonary surfactant (surfactant TA) has been shown to be effective in both the prevention and the treatment of respiratory distress syndrome in premature babies. Recently, two types of protein-free totally synthetic surfactants, artificial lung expanding compound (ALEC) and Exosurf, have been evaluated in clinical trials of surfactant therapy. Artificial lung expanding compound was used initially as a dry powder, but is now prepared as a crystalline suspension in saline at 4 degrees C. In this study we compared the biophysical properties of three different forms of ALEC (dry powder, crystalline suspension at 4 degrees C and 37 degrees C), Exosurf and surfactant TA (Surfacten) using a modified Wilhelmy surface balance and a pulsating bubble surfactometer. Surface activity of a crystalline suspension of ALEC in cold saline was no better than the dry powder of ALEC. Surfactant activity of ALEC was improved by addition of hydrophobic surfactant protein B and C (SP-B, SP-C) which are important constituents of surfactant TA. Surface properties of ALEC in any form and Exosurf were not superior to those of surfactant TA. These results suggest that a surfactant which contains SP-B and SP-C does not necessarily have to be dry or crystalline for an effective exogenous surfactant.

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